AIRPHOTO INTERPRETATION OF ENGINEERING SOILS OF INTERSTATE HIGHWAY ROUTE I-65 IN TIPPECANOE, CLINTON AND BOONE COUNTIES, INDIANA

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NO. 28

by

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and

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Joint Highway Research Project

PURDUE UNIVERSITY
LAFAYETTE INDIANA

Progress Report

AIRPHOTO INTERPRETATION OF ENGINEERING SOILS

INTERSTATE ROUTE I-65: TIPPECANOE, CLINTON AND BOONE COUNTIES, INDIANA

TO: E. B. Woods, Director
Joint Highway Research Project

October 28, 1964

FROM: H. L. Michael, Associate Director
Joint Highway Research Project

File: 1-5-5
Project: C-36-51E

The attached report entitled "Airphoto Interpretation of Engineering Soils of I-65: Tippecanoe, Clinton and Boone Counties, Indiana," completes a portion of the project concerned with engineering soils mapping of the Interstate system from aerial photographs. This project was prepared as a part of an investigation conducted by Joint Highway Research Project in cooperation with the Indiana State Highway Commission, the Soil Conservation Service and the Bureau of Public Roads. The report was prepared by P. T. Yeh, Research Engineer, and S. J. G. Bird, Research Assistant, Joint Highway Research Project.

The soil mapping of I-65 between SR 43 and Lebanon was done entirely by airphoto interpretation technique. To increase the value, the soil strip map was prepared on a photographic base with annotation to show soil areas. The generalized soil profiles were prepared from the available literature.

Respectfully submitted,

H. L. Michael

H. L. Michael
Associate Director

HLM:pm

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Conducted By

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Engineering Experiment Station
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AIRPHOTO INTERPRETATION OF ENGINEERING SOILS

INTERSTATE ROUTE I-65: TIPPECANOE, CLINTON AND BOONE COUNTIES

INTRODUCTION

This report and series of photographic strip maps represents the airphoto interpretation of engineering soils for a section of Interstate 65 from SR 43, about five miles north of Lafayette, to the intersection of I-65 with U. S. 52, near the northern limit of the town of Lebanon. The report is a continuation of the report submitted for the I-65 section in Newton, Jasper, White and Tippecanoe Counties dated July, 1964 (1)*.

Unrectified aerial photographs of a scale of 1/20,000, obtained by the United States Department of Agriculture were used in this study. The photographs of Tippecanoe County were obtained in the fall of 1957, and those of Clinton and Boone Counties, in the spring of 1939. The reader should be aware that many cultural or surface features in the area have changed since the aerial photography was taken.

The aerial photographic strip map is presented in a mosaic at an approximate scale of one inch representing 1500 feet (1/18,000). Since unrectified aerial photographs were used, the aerial mosaic may not be matched perfectly from one to the other.

The engineering soil maps were prepared by airphoto interpretation methods. The procedures used are similar to those employed in county mapping projects previously completed by the staff of the Joint Highway Research Project (2). No field checks or soil explorations were made for this mapping study. However, available literature concerning this area was searched and used to complete the interpretation (3). Reference was made to the agricultural Soil Surveys for Tippecanoe County (4), Clinton County (5), and Boone County (6). Information was also obtained from "The Formation, Distribution, and Engineering Characteristics of Soil" (7).

DESCRIPTION OF AREA

General

The area of interest along I-65 starts at SR 43, about 5 miles north of Lafayette in Tippecanoe County. The proposed route crosses Burnetts Creek in a southeasterly direction. The centerline then heads south-southeast for approximately four miles, passing Lafayette to the east. The route then swings to the south-east, crossing the south-west corner of Clinton County, into Boone County. The centerline then changes to south-southeast again for the last six miles (approximately), heading toward Lebanon. The section ends at U. S. 52, just north of Lebanon, Boone County. The area of interest is about three miles wide and 36 miles long.

Physiography

The entire area of interest is situated in the Central Till Plains Section of the Central Lowlands Province of the United States (8). On a local basis the area is entirely contained within the Bloomington Morainic System and the associated Tipton Till Plain Section. Several end moraines (undifferentiated) occur as local ridges. At the northern end the route

* Refers to bibliography at end of report.

traverses the Valley of the Wabash River.

Topography

The overall topography of the area is a relatively flat plain, having a gently undulating surface, broken by the Wabash River valley, and weak ridge moraines of the Bloomington Morainic System.

The surface of Tippecanoe County slopes gently toward the entrenched Wabash River valley from both the northwestern and the southeastern corners of Tippecanoe County. In some parts of Tippecanoe, Clinton and Boone Counties remnants of poorly defined morainic ridges of the Bloomington Morainic System are scattered throughout the study sections. The morainic areas generally exhibit a rolling to hilly surface in the part of the county through which I-65 passes. The Wabash River valley is the most striking physiographic feature of the I-65 route. The most rugged topography is located along the north-western bank north of West Lafayette, where the maximum local relief of about 210 feet is obtained about three miles west of the proposed route. There are two main levels of stream terraces along the Wabash River. The high terrace is about 600 feet in elevation, while the lower one is about 500 feet in altitude. Both of the terraces are flat-topped and seperated from the adjacent flood plain by short, steep slopes. Some sand dune formations, having irregular shape, occur on the terraces, rising about 5 to 15 feet higher than the surrounding terrace. To the south of the Wabash River, along the route of I-65, dissected and rugged topography occurs along Wildcat Creek, a tributary of the Wabash River.

The portions of the counties of Clinton and Boone which appear on this strip map for I-65, have no unusual topographic features. This area mainly consists of featureless ground moraine, broken by the occasional, more rolling, ridge moraine.

Geology

The surface materials of the study area are chiefly the result of glacial deposition. Subsequent wind and water action has modified some of the deposits to a considerable extent. The bedrock geology is of academic interest only because no rock exposure is known to outcrop along the route. The underlying bedrocks are primarily of Mississipian and Silurian Age. However, a small portion of the route in Clinton County overlies bedrock of Devonian Age. Mostly limestones, dolomites, and shales underlie this area. Bedrocks are generally deeply covered throughout this portion of the route of I-65. Tippecanoe County is covered by a mantle of glacial till up to 300 feet in thickness. The thinest overburdens, along the route of I-65 occurs in the southwestern part of Tippecanoe County, where the glacial cover is about 150 feet (9).

Clinton County is covered with a mantle of glacial till which varies from 150 to 350 feet (10). The drift thins to less than 100 feet toward the southwest corner of Boone County. However, the bedrock is expected to be at depths of over 100 feet along the proposed route (11).

The unconsolidates surficial materials were deposited by several different substages of the Wisconsin Glacial period (11). The Tipton Till Plain Section, in which all of this portion of I-65 is included, is associated with the Bloomington Morainic System of the Early Wisconsin period (8). Wayne includes these glacial drifts in the Trafalgar formation (12). The glacial drift material is composed of unstratified boulders, gravel, sand, silt and clay. Local outwash deposits may underlay the glacial drift (9).

In some areas, especially those on the northern part of the study section, a thin loess mantle was deposited by wind on top of the glacial drift. Some sand dunes exist on the terraces in the Wabash River valley. Several terrace

deposits were formed along the banks of the Wabash River and the Wildcat Creek. This material is a coarse textured gravel.

Climate

The study area is situated in a continental, humid, and temperate zone. There is a wide variation in temperature during the year (from - 33°F to 105°F). The extremes of temperature are usually of short duration. The annual precipitation is about 38 inches, which is fairly well distributed throughout the year. The mean freezing-index (Corps of Engineers) is about 350.

LAND FORMS AND ENGINEERING SOIL AREAS

Engineering soils along the proposed route of I-65 are, in general, silty-clay in texture. Exceptions occur along the terraces of the Wabash River and Wildcat Creek, and on the outwash plains south of Wildcat Creek, which are sandy to gravelly in texture. Variation in the soil profile is expected as the land forms change, or as topography varies on a specific land form.

A total of twenty-five soil areas have been differentiated and numbered for the route of I-65 described herein including the portion of the route immediately to the north of this section. The northern portion is described in Joint Highway Research Project Report No. 17, Purdue University, Lafayette, Indiana, by P. T. Yeh (1). This northern portion of I-65 contained 21 soil areas and 33 soil profiles. For simplicity of explanation and for easier correlation with the route to the north of this section, all soil profiles for the twenty-five soil areas will be appended to this report, although only four soil areas (Areas 22 to 25 inclusive) are additions for the southern section reported herein. Sixteen soil areas actually appear on the annotated mosaic for this report.

The soil areas generally designate land forms such as sand dunes (3), ridge moraine (6, 25), ground moraines (9, 10), terraces (16), floodplains (17), depressions (18, 19), eskers and kames (21), and outwash plains (22, 23, 24). A few soil areas represent transition zones such as loess on glacial deposits (8, 12, 13). Because of significant topographic differences within certain land form areas a soil profile may be indicated for both a high and a low position. With this variation, Report 17 and this report contain 42 soil profiles of which 26 are actually used in this report. These profiles are believed to be representative of soil conditions expected along the proposed route.

The discussion that follows is a brief description of each soil area portrayed on the aerial photographic strip maps including the soil areas previously reported along I-65 in report 17 (1).

1. Sandy Outwash Deposit

This type of soil does not appear on the route described in this report.

2. Sandy Outwash Deposit, Organic

This type of soil does not appear on the route described in this report.

3. Sand Dune Deposit

The sand dune deposits are concentrated on the terraces of the Wabash River. The dunes are irregular in shape, exhibit softly rolling topography and vary in height from about 4 to 15 feet. Most of these dunes are stabilized, and are now used for agricultural purposes. The dune area is outlined with dotted lines, and marked with the symbol 3 on the mosaic.

Soil profile 3 shows that a uniform sand (A-3 soil)is found along the dunes where the deposit of the windblown materials is deep. Occasionally a faintly coherent fine sand is developed with layers of loose sand below the surface. At variable depths beneath the surface, the buried sandy clays

and gravelly-clays of the terrace soil are found.

4. Incipient Sand Dune Deposits

This type of deposit does not appear on the route described in this report.

5. Sand Dunes on Ridge Moraine

This type of deposit does not appear on the route described in this report.

6. Ridge Moraine of Silt Loam

This deposit is indicated on the mosaic as soil area 6. These ridge moraines are located near the border of Clinton and Boone County line and, also, in the southern portion of the study area. These ridge moraines are only slightly higher than the surrounding ground moraine and they show a very gently undulating topography.

The topsoil consists of silt loam to silty clay loam under timber cover. A higher organic content is expected in the prairie area located north of the Clinton and Boone County line. Subsurface soil varies from silty clay to clay. The glacial drift consists of loam, silt loam or clay loam. In the depressions, the topsoil varies from an organic silty clay to an organic clay.

7. Ridge Moraine of Organic Loam

This type of deposit does not appear on the route described in this report.

8. Thin Loess on Ridge Moraine

Ridge moraines with a thin loess cover occur in Tippecanoe and Clinton Counties. They are shown as area 8 on the maps. Undulating to rolling topography is predominant in these areas.

The drift deposit is covered by loess with a depth ranging from less than 18 to about 36 inches. The surface soil, therefore, is generally classified as a silty clay loam, a soil containing a high percentage of silt. The subsoil is clayey in texture. The parent material varies from a loam to a clay loam, the amount of sand and gravel increasing with depth. In the depressions or basins, a higher organic content occurs in the surface soils.

9. Ground Moraine of Silty Clay Loam

Several ground moraines are differentiated near both ends of the aerial photographic strip maps. Area 9 represents a deposit having a gently undulating topography, with well developed gully systems.

The topsoil in this region varies from a silt loam to a silty clay loam in the high positions, to an organic silty clay texture in the low positions. The subsoil ranges from silty clay to clay, while the parent material indicates a loam or clay loam texture.

10. Ground Moraine of Organic Silt Loam

Although the proposed route is not directly located on this deposit, the region shown on the mosaic does include soil area 10. This area is situated in Clinton County. It is a relatively flat to locally undulating plain.

The soil is developed under the influence of prairie vegetation. The surface soil varies from a highly organic silt loam to an organic clay. The subsoil is of a silty clay to clay texture. The parent material is a till that varies from a loam to a clay.

11. Ground Moraine of Organic Silt Loam

This type of deposit does not appear on the route described in this report.

12. Loess on Ground Moraine

This type of deposit occurs on the border between Tippecanoe and Clinton Counties north of the Little Potato Creek. This area, referred to as soil area 12, has undulating topography. The soil is developed under prairie vegetation.

The loess cover on the ground moraine varies from 18 to 36 inches. The soil profiles are characterized generally by a slightly organic silty clay topsoil, a clay subsoil and a clay loam parent material. However, the topsoil may vary from an organic silt loam to an organic silty clay loam and even organic

clay depending on the topographic position.

13. Thin Loess on Ground Moraine

This deposit occurs in large areas in the southern part of Tippecanoe County and southwestern part of Clinton County.

The profile is essentially the same as the one previously described except that the soils have developed under the influence of timber cover. The soil profile differs from those for area 12 in that a negligible amount of organic matter occurs in the topsoil on high topographic positions. The subsoil and parent materials are essentially the same as discussed for area 12.

14. Lacustrine Deposits of Sands and Silt

This type of deposit does not appear on the route described in this report.

15. Lacustrine Deposits of Clay

This type of deposit does not appear on the route as described in this report.

16. Terraces

The terraces recognized on the aerial photography in this study are chiefly located in Tippecanoe County. The larger terraces occur along the Wabash River. Several smaller terraces occur along Wildcat Creek, a tributary of the Wabash. The topographic break between the valley wall and the terrace surface is conspicuous. Some small terraces are also found along Sugar Creek and Spring Creek in Boone County.

The soil profile on the terraces consists of a surface horizon that varies from a sandy loam to a silty clay loam. The depth of the horizon varies from zero on the steep terrace face to about 18 inches on the level surface. The subsoil shows generally an increase of clay and plasticity with respect to the layer above. The amount of sand and gravel increases with depth. The parent materials are stratified sands and gravels.

Some of the low terraces along the Wabash River and Wildcat Creek have slackwater deposits, which occur in a slightly depressed area next to the terrace face of the upper terrace or near the valley wall. These deposits tend to be similar to the profile for the low topographic position of soil area No. 16. They have a much greater amount of silts and clays in the subsoil.

17. Alluvial Plains

All drainage channels in the area surveyed possess recent alluvial plains or floodplains. The largest floodplains are located in Tippecanoe County along the Wabash River and along Wildcat Creek. Many of the smaller creeks have been straightened by ditching.

The texture of the alluvial deposits varies greatly from one place to the other, depending on the nature of the drainage basin. The surface soil varies from a sandy loam to a silt loam or clay loam. In the swales and depressions of the floodplain, a highly organic silt loam, silty clay loam, silty clay or clay topsoil may be found. The subsoil varies from a silt loam to a silty clay or stratified silt, sand, and clay may be present. Occasionally the subsoil may contain thin layers of sandy or gravelly material. Along the Wabash River and Wildcat Creek, coarse-textured deposits frequently occur at depth.

18. Organic Depressions

Many depressions in the study area are mapped as organic depressions. They are the results of accumulation of organic matter in poorly drained topographic positions. The majority of these areas occur within the ridge moraines and on the ground moraines. A few are identified in the terrace areas.

The soil profile consists of an organic silty clay or organic clay

topsoil, a plastic silty clay or clay subsoil, and a clay or clay loam parent material.

19. Muck and Peat Deposits

Most of the muck and peat deposits are located on the ridge and ground moraines. These soil areas occur in all three counties, mainly in small isolated depressions. Most of the peat is derived from mosses, sedges, and wood. In some kettles, a soft layer of marl, ranging from a few inches to 12 inches or more in depth, is found under 12 to 42 inches of muck. The marl is an earthy material, composed principally of an amorphous form of calcium carbonate. Since it is also undesirable from the engineering standpoint, no seperation is made from the peat and muck in the soil profile illustrated.

The depth of these cumulose deposits varies greatly from one location to another. Therefore, field investigation of each individual deposit is required. Treatment of each deposit will be directed accordingly.

20. Clay Depressions

This type of soil does not appear on the route described in this report.

21. Eskers and Kames

A few kames appear on the route, in the southern part of Tippecanoe County and in the northern part of Boone County. These kames are low, conical mounds, and are not conspicuous. The only esker is found near the north county border line in Boone County.

The soils developed on eskers and kames vary considerably. The shallow surface horizon varies from a sandy loam to a clay with varying amounts of sand and gravel. The amount of sand and gravel increases very rapidly with depth. Clean, stratified, coarse material is found in the parent material zone.

22. Gravelly Outwash Plain Deposit

This type of deposit is mapped as soil area 22 and occurs in a relatively large and nearly level area to the south of the Wabash River in Tippecanoe County.

The topsoil consists of loam to silty clay loam, underlain by a subsoil of a silty clay to a clay. As the depth below the subsoil increases, the material becomes a gravelly or sandy clay. At a depth of three feet to six feet below the surface, the parent material of stratified sands and gravels is encountered.

23. Gravelly with Fines Outwash Plain Deposit

This type of deposit is similar to the one previously described. The principal difference is in the appreciably amount of fines contained in the deposit. This type of soil is found in the southern portion of Tippecanoe County and in Boone County.

The topography of this deposit is more undulating that that of profile number 22. Because of this, two profiles have been shown. The soil on the topographic highs is similar to that of number 22, with the main differences being the greater and more variable depth of the upper, fine-textured horizons. Parent material, in this soil, is encountered at a depth of from two to 12 feet. In the low areas, the depth of the finer textured horizons is greater than that of the topographic highs. The parent materials are sandy gravel with appreciable amount of fines and show a plastic index range of from five to 15 percent in the test data of Tippecanoe County (3).

24. Outwash Deposit of Highly Organic Topsoil

The areas classified as highly organic topsoil outwash plain deposit are located on the outwash plain along the Wildcat Creek southeast of Dayton and on the outwash plain southwest of Dayton. It is somewhat lower topographically than the outwash deposit previously mentioned.

The soil profile consists of a very dark colored, highly organic A-horizon which varies in both depth and texture from organic silt loam to

organic clay. The B-horizon varies from silty clay to clay. The parent materials also varies both in depth and texture from stratified sand and gravel to clay loam.

25. Ridge Moraine of Sand

Along the tributary of South Fork Wildcat Creek in Sections 4, 9 and 10 of T.21 N., R. 2 W. in Clinton County (East of Fickle) and along Sugar Creek and Prairie Creek, tributary of Sugar Creek in Boone County, several areas can be classified as sandy ridge moraine. Rolling and hummocky topography are the predominant landscape in these regions. More hilly topography is found in the areas along the tributary of South Fork Wildcat Creek. Consequently a more coarse textured deposit can be expected there.

The soil profile consists of a loam to silty clay loam A-horizon, followed by a sandy clay loam to clay subsoil and a sandy loam to clay loam parent material. The amount of gravel content increases to the north and toward the drainage channels as well.

In the depressions, organic silty clay or organic clay soil is found. The B-horizon varies from silty clay to clay and the parent material varies from a loam to clay loam.

SUMMARY

The proposed route starts at the intersection with SR 43, about five miles north of Lafayette, on a silty clay loam ground moraine (Area 9). It crosses southeastward across the upper terrace (Area 10), then across a narrow flood plain and turns to the south onto a low terrace of the Tippecanoe River, an area covered by many irregular sand dunes (Area 3). After crossing the Tippecanoe River and associated floodplain, the route continues across a gravelly outwash plain deposit (Area 22) for about two miles, interrupted only by two short sections over floodplains (Area 17) of the Wildcat Creek.

The route changes in direction to the southeast after crossing Wildcat Creek, and a silty clay loam ground moraine (Area 9) is encountered again for a distance of about two miles. For the next three and one-half miles, the route traverses a ground moraine covered with a thin layer of loess (Area 13). However, for a short portion at the northern part of this ground moraine the route encounters an outwash plain deposit (Area 23). Area 13 contains several organic depressions (Area 18). The route then passes through another area of outwash plain (Area 23), for a distance of about two-thirds of a mile, near Dayton. For the next two miles, the terrain is composed of a ridge moraine deposit covered with varying depths of loess (Area 8), an outwash plain deposit (Area 23), and another ridge moraine (Area 8).

The proposed route then comes to a three mile stretch of a relatively flat, ground moraine deposit (Area 13), broken only by Shady Brook, a tributary of Wildcat Creek. The next four miles are composed of an undulating ridge moraine deposit covered with a thin blanket of loess (Area 8). The route crosses Shady Brook once again within Area 8.

The route then traverses the slightly undulating, prairie influenced, ground moraine (Area 12) and then enters the ground moraine supporting timber cover (Area 13). After passing the muck area along Little Potato Creek, the next mile and one-half consists of an area of thin loess deposit on ridge moraine material (Area 8). Another three mile stretch of thin loess covered ground moraine (Area 13) follows immediately.

The proposed route enters the undulating to slightly rolling silt loam ridge moraine (Area 6) about one and one-half miles north of the Boone County border where the influence of loess is less pronounced. A few organic depressions (Area 18) are crossed within this region. The route then follows a relatively flat outwash plain (Area 23) before reaching Sugar Creek. After

crossing the narrow floodplain of Sugar Creek, the route enters a short stretch of sandy ridge moraine (Area 25) then onto the silt loam ridge moraine (Area 6).

A small terrace is encountered before the route crosses Spring Creek. The remaining two miles of the route consists of gently undulating silty clay loam ground moraine (Area 9). The proposed route crosses Prairie Creek twice before the intersection of U. S. 52 north of Lebanon.

ACKNOWLEDGMENTS

All airphoto used in connection with the preparation of this report automatically carry the following credit lines: "photographed for United States Department of Agriculture."

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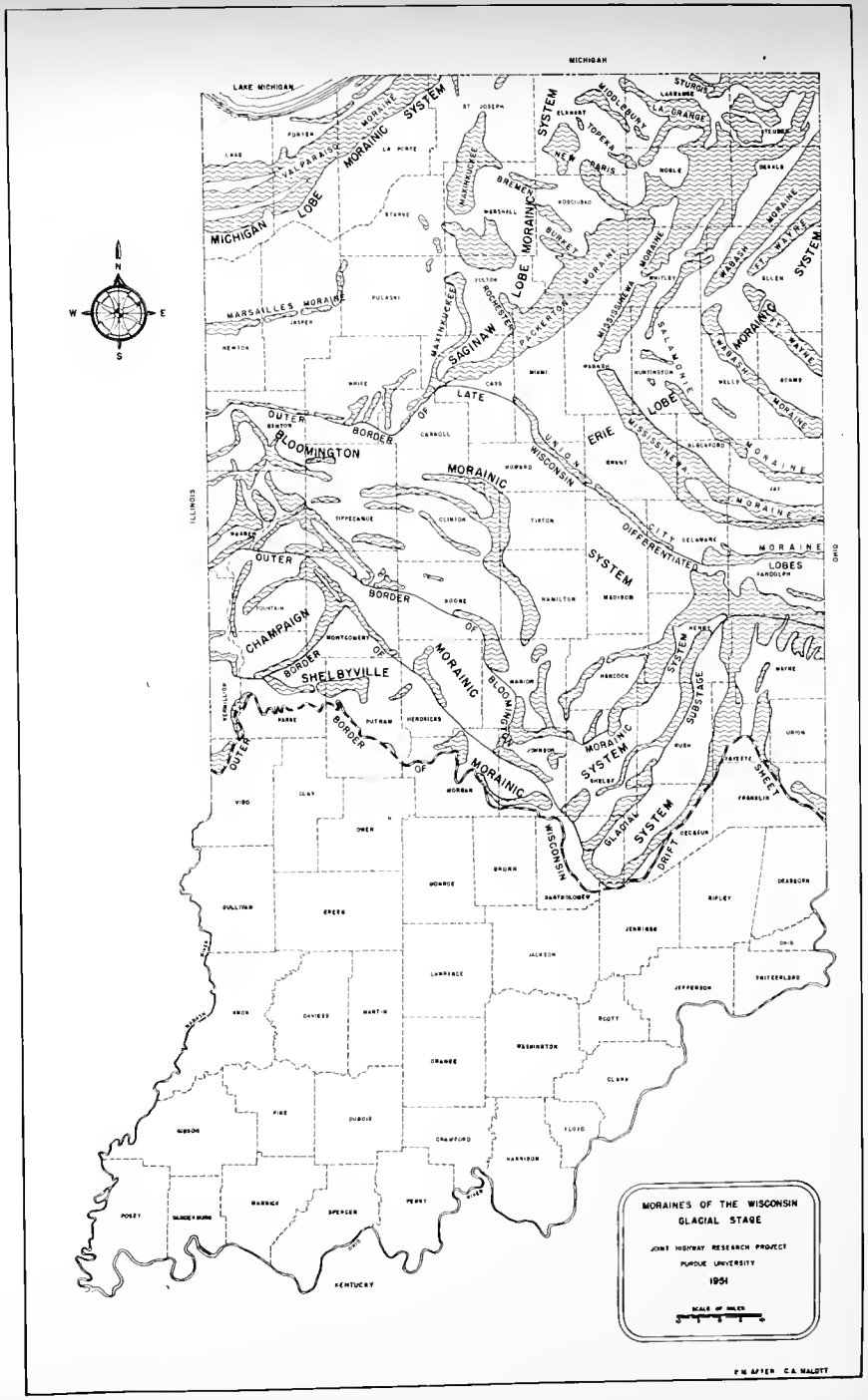
SOIL CLASSIFICATION AND PROFILE SYMBOLS

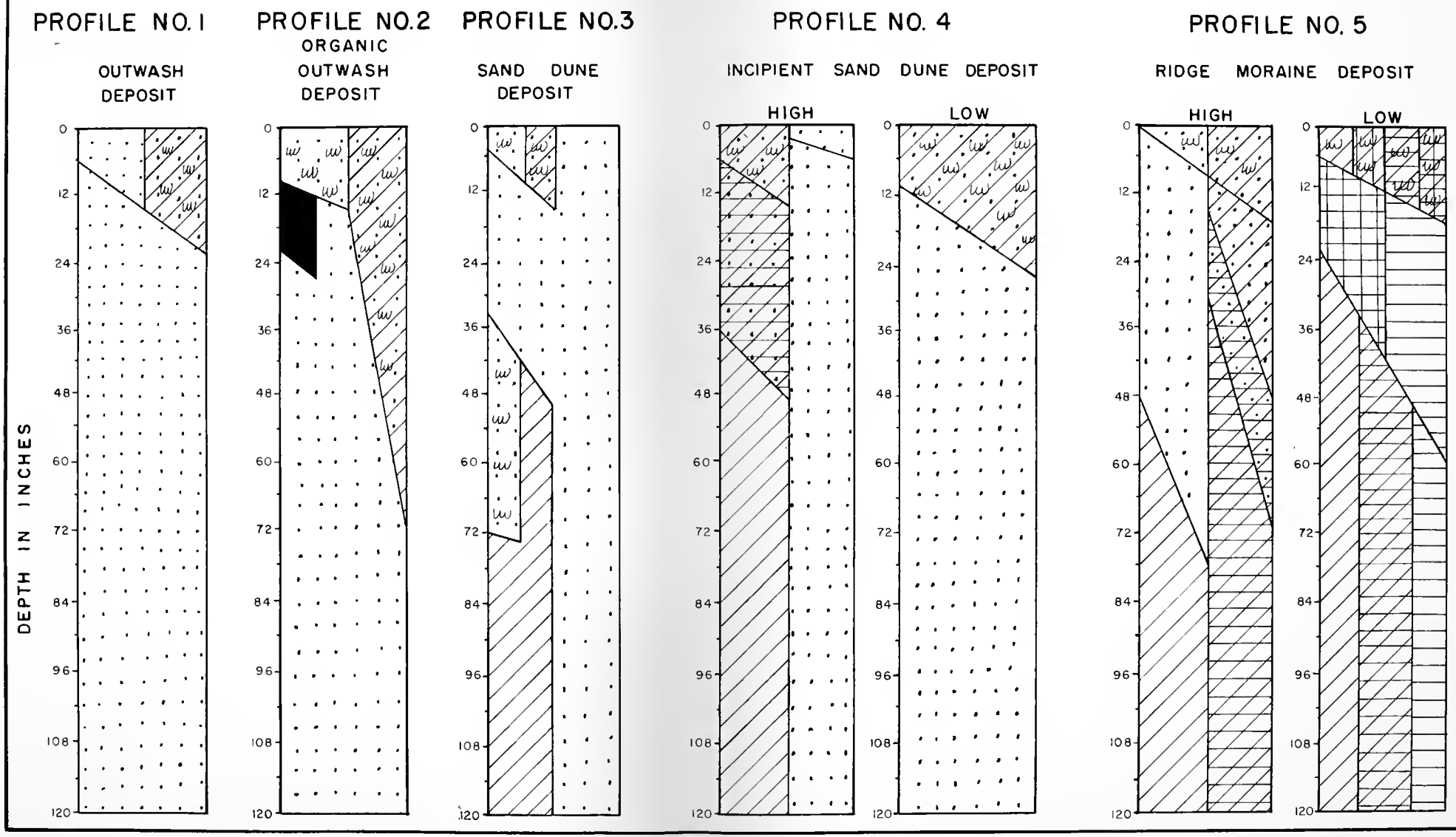
Description	Grain Size Distribution				Plastic Index	Symbol
	Gravel % Retained on #10	Sand #10–#200	Silt 0.05–0.005mm	Clay Less than 0.005mm		
Gravel	85–100	0–15	0–10	0–10	NP	
Sandy Gravel	50–85	15–50	0–10	0–10	6 Max.	
Sand	0–15	85–100	0–10	0–10	NP	
Gravelly Sand	20–49	45–85	0–10	0–10	6 Max.	
Sandy Loam	0–19	50–80	0–50	0–20	6 Max.	
Sandy Clay Loam	0–19	50–80	0–30	20–30	10 Max.	
Sandy Clay	0–19	55–70	0–15	30–45	11 Min.	
Loam	0–19	30–50	30–50	0–20	10 Max.	
Silt Loam	0–19	0–50	50–100	0–20	10 Max.	
Silty Clay Loam	0–19	0–30	70–100	20–30	11 Min.	
Silty Clay	0–19	0–15	55–70	30–45	11 Min.	
Clay Loam	0–19	20–50	50–80	20–30	11 Min.	
Clay	0–19	0–55	0–55	30–100	11 Min.	
Peat or Muck						
Limestone						
Sandstone						
Shale						
Stony Fragments						
Organic Matter						
Topsoil						

Classification of Gravelly Soils

85%–100% gravel plus finer material – Gravel
50%–84% gravel plus finer material – Clayey, silty or sandy gravel
20%–49% gravel plus finer material – Use fine classification and called gravelly sand, gravelly silt or gravelly clay
0%–19% gravel plus finer material – Use fine classification only



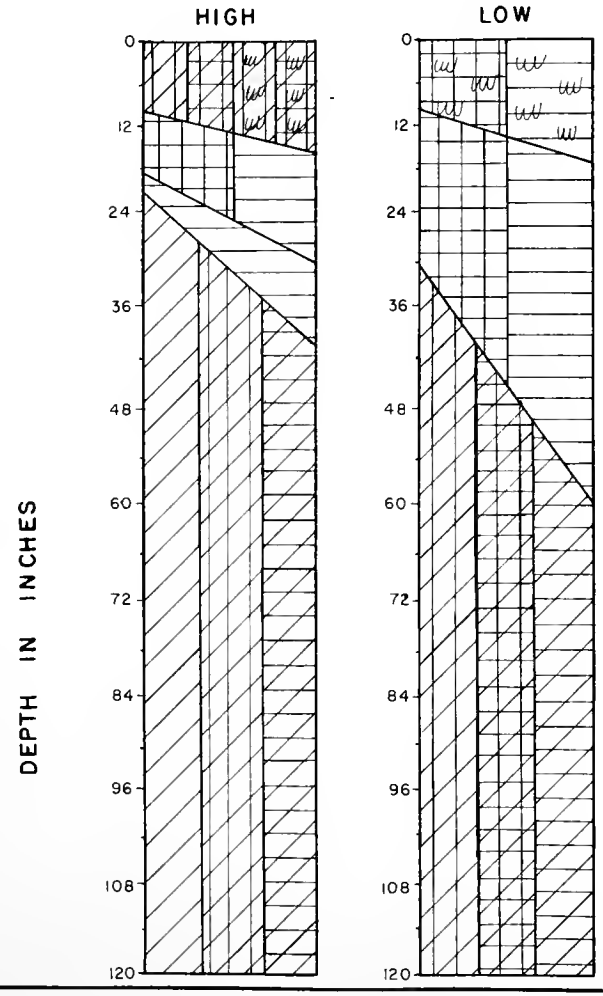
GENERAL SOIL PROFILES



GENERAL SOIL PROFILES

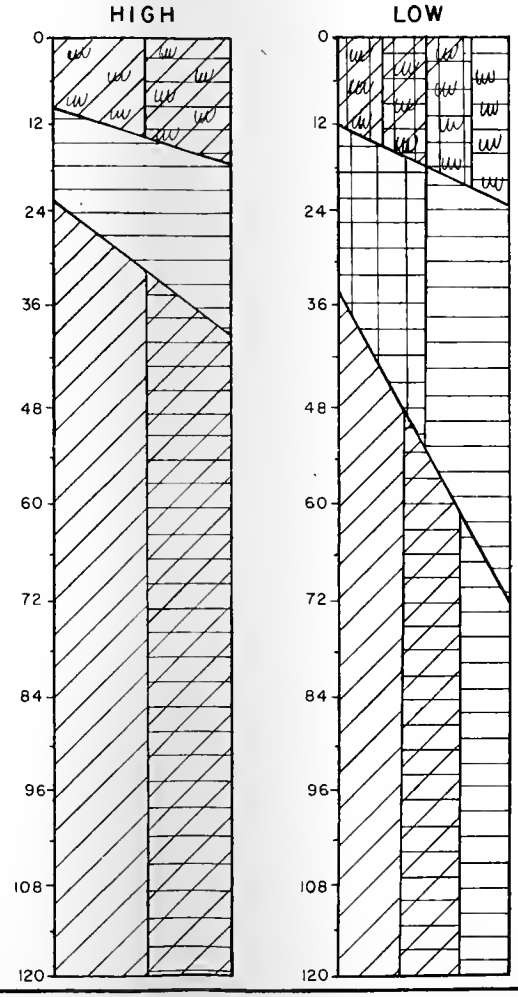
PROFILE NO. 6

RIDGE MORAINE DEPOSIT



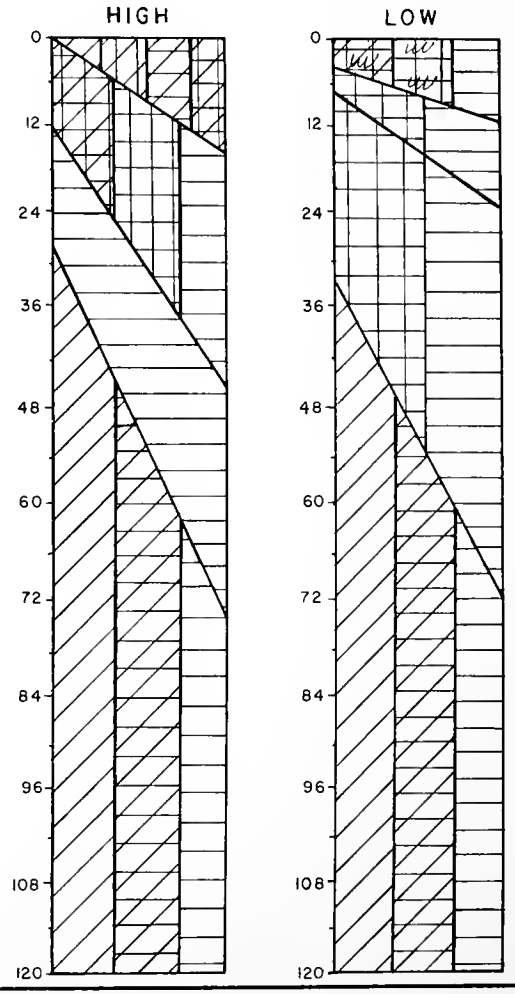
PROFILE NO. 7

RIDGE MORAINE DEPOSIT

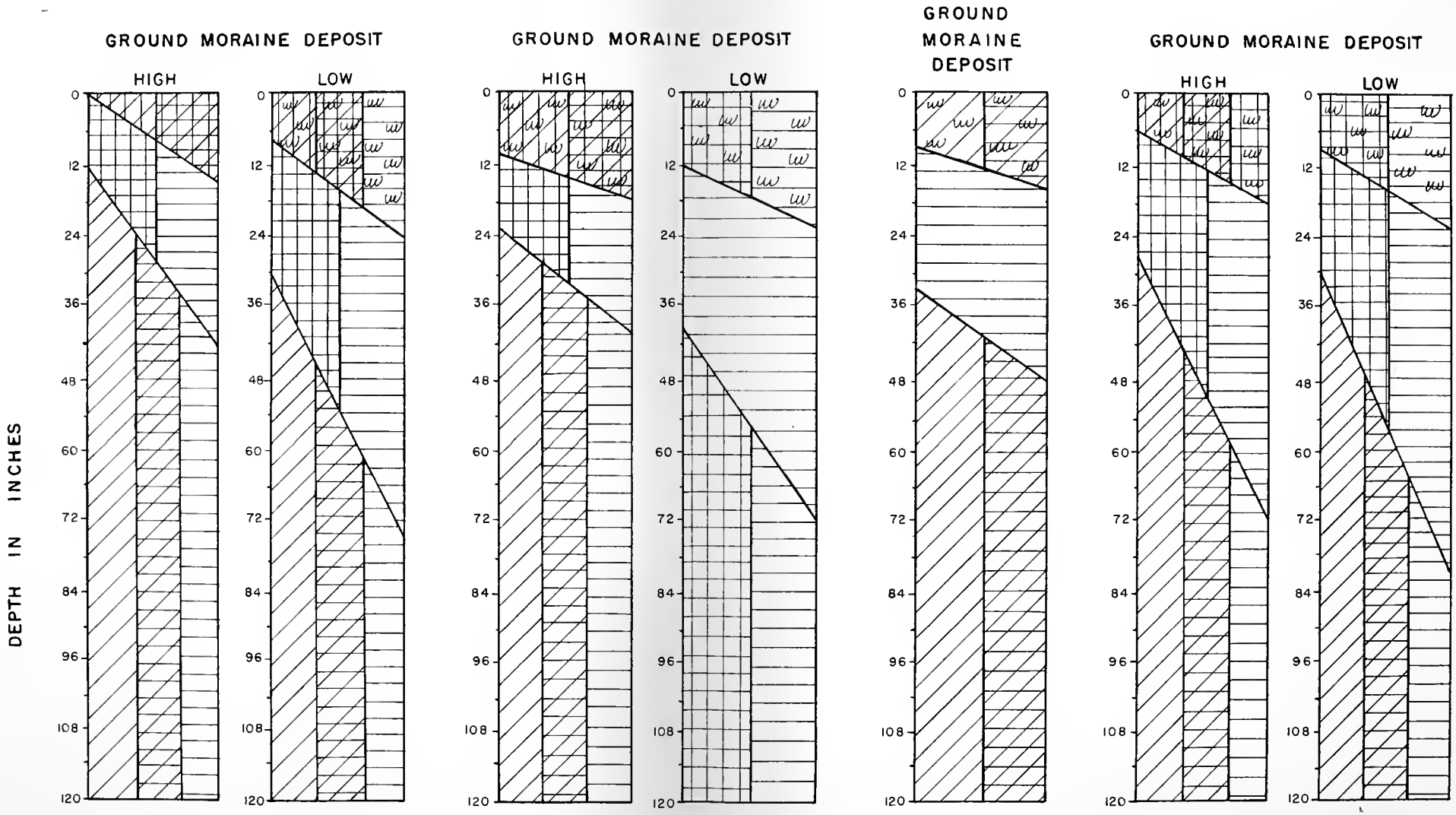


PROFILE NO. 8

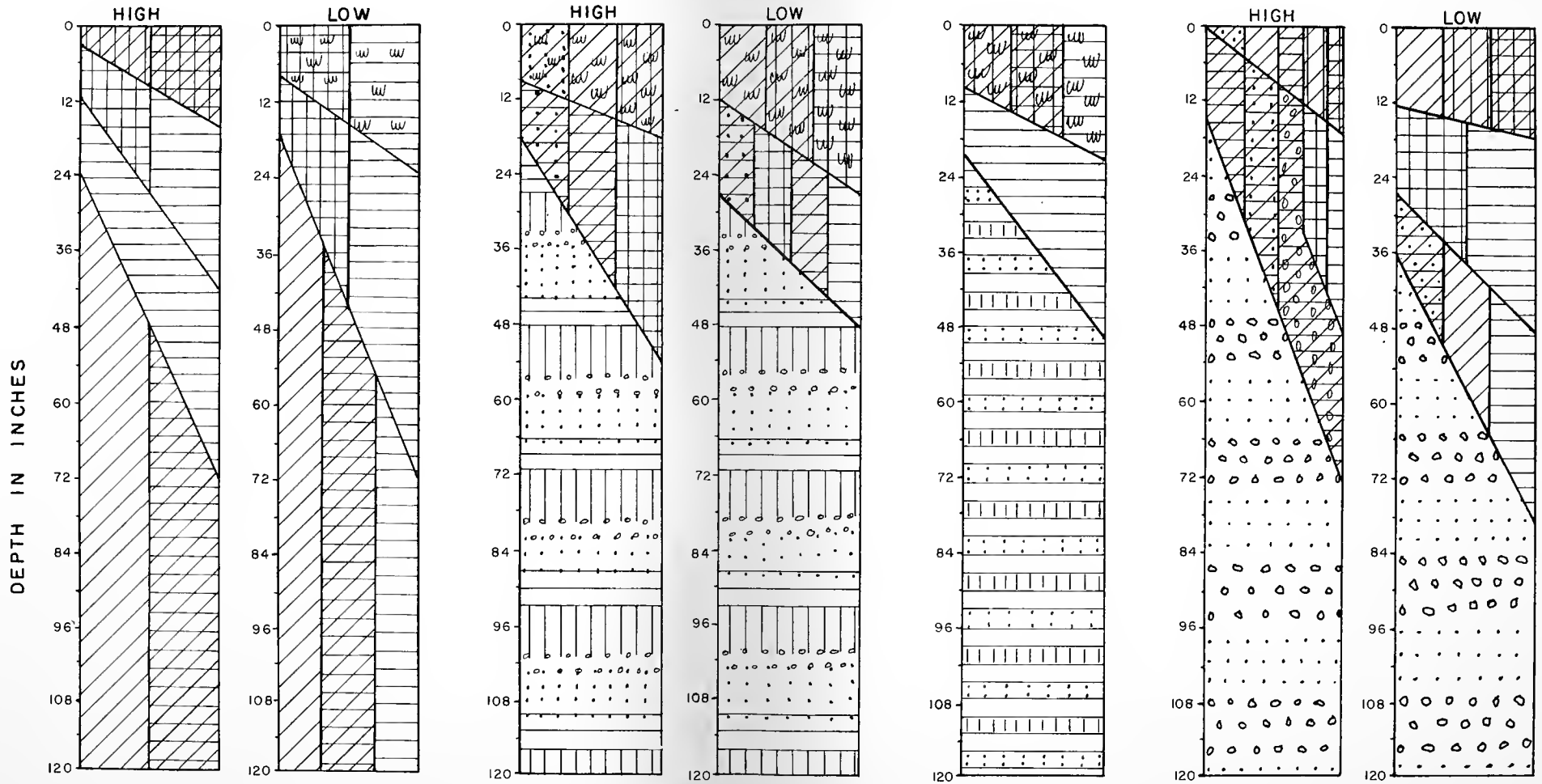
RIDGE MORAINE DEPOSIT



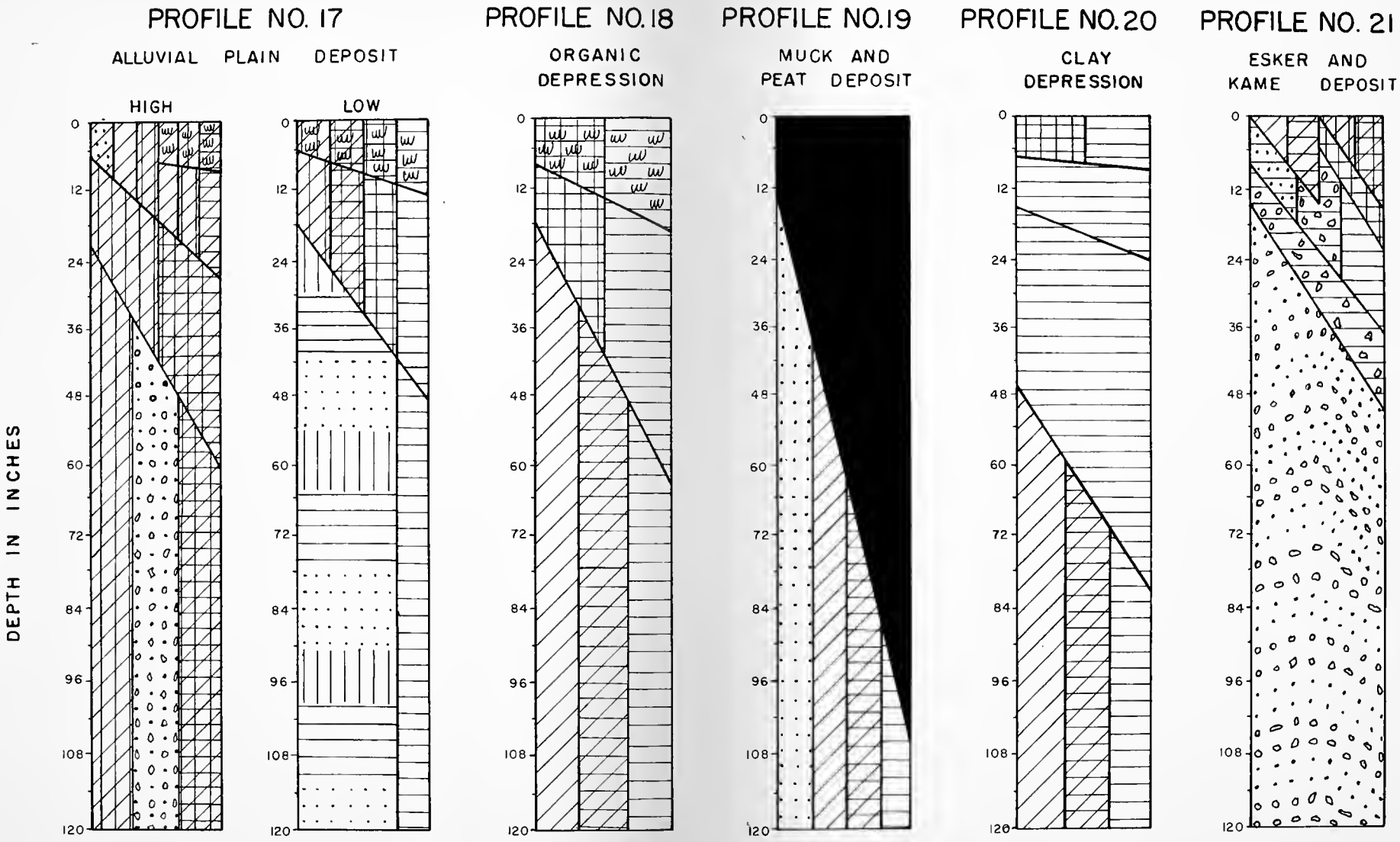
GENERAL SOIL PROFILES



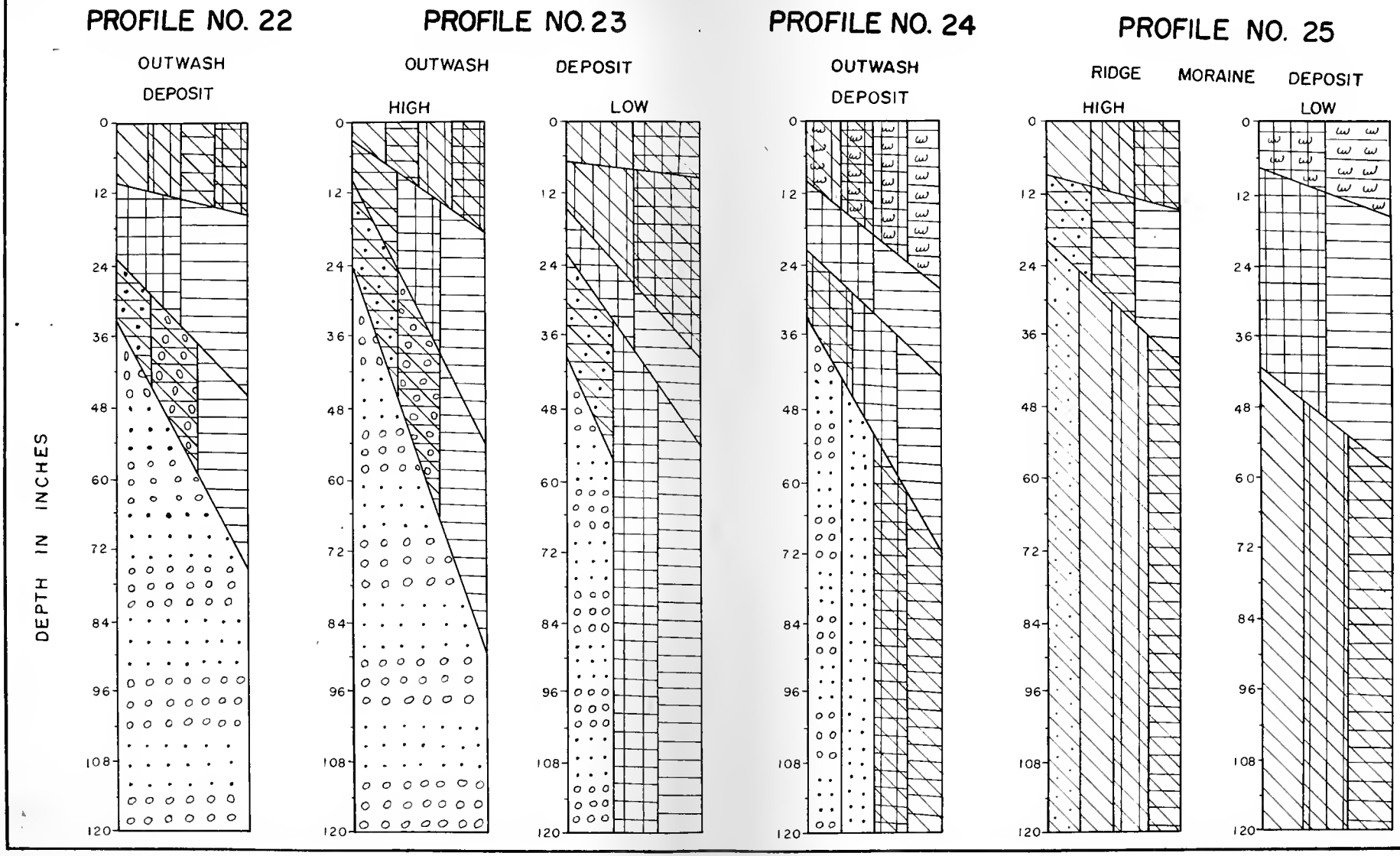
GENERAL SOIL PROFILES



GENERAL SOIL PROFILES



GENERAL SOIL PROFILES

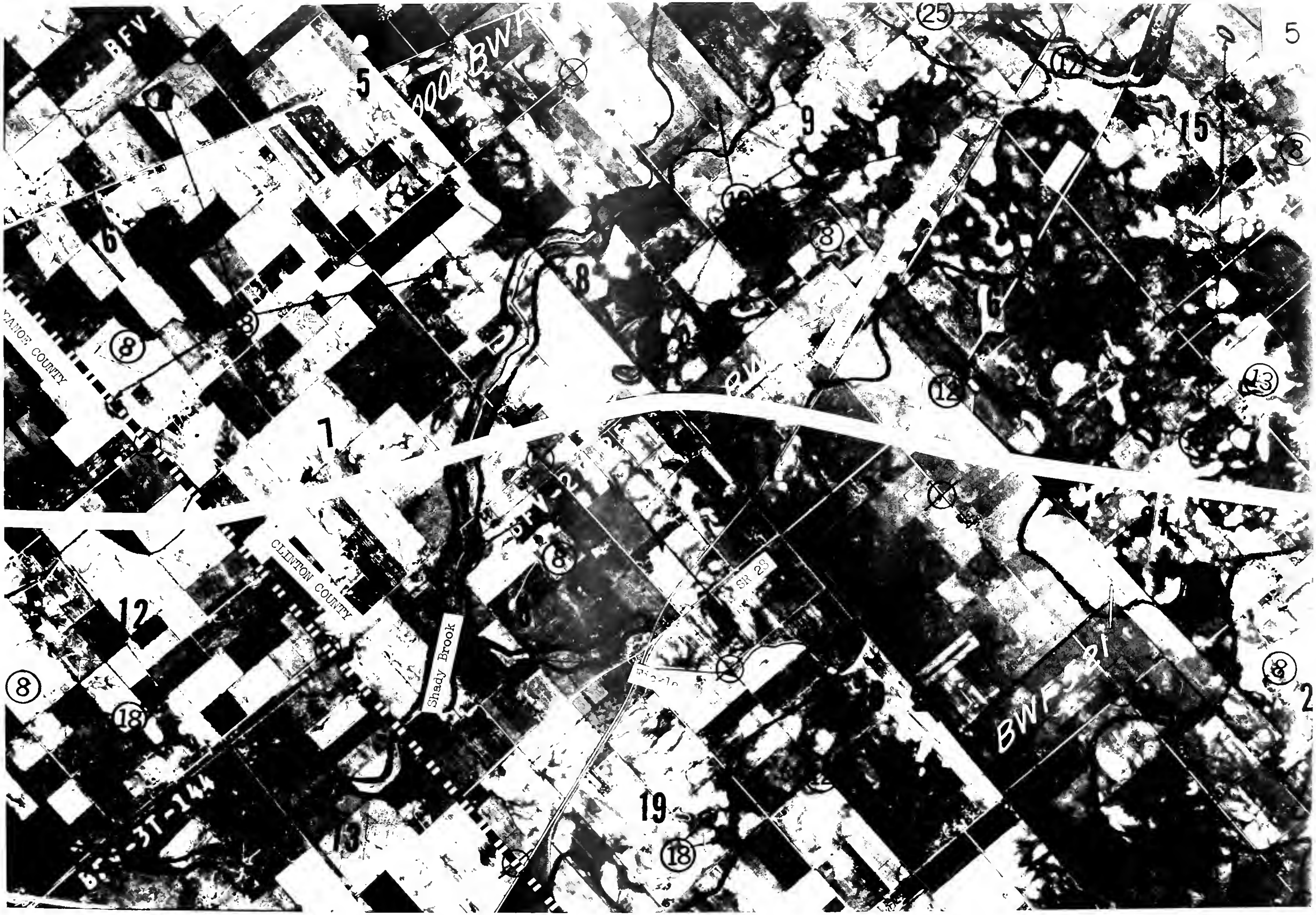


WABASH RIVER
Wabash RR
Gravel Pit
SR 43
Burnetts Creek
WABASH RIVER
WILDCAT CREEK
US 52
SR 43


2
2
SOUTH FORK
29
32
30
WILDCAT CREEK
Pond
LAFAYETTE
22
16
17
23
13
18
19
6


SOUTH FORK
WILDCAT CR
DAYTON
SR 38
Richardville Reserve
Gravel Pit
New York Chicago and St. Louis RR
US 52
BFV-3T-94
7-7-57

TIPPECANOE COUNTY
US 52
MONROE
Shady Brook
Shady Brook


BFV
BWF
5
6
7
8
9
15
16
12
13
19
18
25
17
CANOE COUNTY
CLINTON COUNTY
Shady Brook
SR 28
BWF-21
3T-144


Little Potato Creek
Pennsylvania RR
BWF
25
31
6
22
17
18
19
13
10
28
27
34
35
11
12
8

BOONE COUNTY
CLINTON COUNTY
Brush Creek
SUGAR CREEK
US-136
A1A


Pennsylvania Ave
Spring Creek
Spring Creek
Prairie Creek
US 52


13
24
25
Pennsylvania
Prairie Creek
Cleveland Cincinnati Chicago and St. Louis RR